

REMARKS

Claims 1-22 are currently pending in the application. None of the claims have been amended. No claims have been added or canceled. Therefore, claims 1-22 remain pending in the application.

Formal drawings were filed with the application on October 24, 2003. Applicants respectfully request that the Examiner acknowledge acceptance of the drawings.

Independent claims 1, 8, 15 and 18 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,016,497 (“Suver”) in view of U.S. Patent No. 6,564,203 (“Krishnaprasad”). In particular, the Office Action contends that Suver discloses “a data structure that aggregates changes to the values at arbitrary levels of a hierarchy of the complex structured column” (Office Action dated June 4, 2007 (“Office Action”) at p.2). Applicants respectfully disagree.

Claims 1 and 15 recite, in part, representing modifications to values in a complex structured type column using a data structure that aggregates changes to the values at arbitrary levels of a hierarchy of the complex structured column. As noted in the present specification:

In a conventional nested table system . . . the nested scalar values are updated one level at a time for each level of scalar values in a collection-valued cell, thus requiring multiple updates to change the stored values in a multi-level cell. . . . In other words, ***only a single row is updated at a time***. This process is slow and tedious and does not permit updates at any designated nested level.

(*Specification* at ¶ [0004]) (emphasis added).

To overcome such limitations, the claimed embodiments include a data structure that ***aggregates changes to the values at arbitrary levels*** of the hierarchy of the complex structured column. For example, an UPDATE statement according to an embodiment may take the following form:

```
UPDATE Employees
SET    Salary = Salary * 1.1,
      (UPDATE Addresses A(addr)
       SET   addr.ZipCode = '98074',
       WHERE addr.State = 'WA')
WHERE EmpID = 1234 OR EmpID =
1235
```

(*id.* at FIG. 2). As further shown in FIG. 2 of the specification, the foregoing statement may update multiple levels of a nested table, such as the salary for Employee 1234 and the zip code for Employee 1235:

| EmployeeID | FirstName | LastName | Salary | Addresses | |
|------------|-----------|----------|--------|-------------------------------------|---------------|
| 1233 | John | Smith | 50000 | 30 Jump Street, Seattle, WA, 98000 | 206-123-45-60 |
| 1234 | Tom | Brown | 66000 | 20 Jump Street, Portland, OR, 97000 | 506-123-45-87 |
| | | | | 21 Pine Street, Seattle, WA, 98074 | 206-123-45-88 |
| | | | | 32 Pine Street, Seattle, WA, 98074 | 206-123-45-89 |
| 1235 | Robert | White | 44000 | 33 Pine Street, Seattle, WA, 98074 | 206-123-45-81 |
| | | | | | |

(*id.*). Suver, by contrast, suffers from the same deficiency identified by Applicants in the Background section of the present specification, *i.e.*, Suver updates values in a collection-valued cell one row at a time.

More specifically, Suver discloses a system for accessing complex data in a relational database (Suver at col. 2, ll. 53-57). Upon receiving an update command from a user, a routine 1500 may be initiated to conduct the update data operation on the database (*id.* at col. 24, ll. 42-44). At step 1504, the physical row that is to be updated is found (*id.* at col. 24, ll. 50-52). At step 1512, the data values in the physical row are then updated (*id.* at col. 24, ll. 59-60). As noted in Suver, “the system can access all of the complex or hierarchically stored data that is stored *in a single row*” (*id.* at col. 18, ll. 52-53) (emphasis added). In other words, like Applicants’ disclosed prior art, Suver’s system updates complex data in a database one row at a time.

Accordingly, Applicants respectfully submit that Suver does not teach or suggest a data structure that aggregates changes to values at arbitrary levels of a hierarchy of a complex structured column. Applicants further submit that Krishnaprasad does not supply the missing teachings of Suver.

As discussed in the Background section of the present specification, Krishnaprasad discloses updating complex data using Data Manipulation Language (DML) and trigger code (*Specification* at ¶ [0004]). The trigger code is “designed to fire when a row of a database table . . . is updated, inserted or deleted” (*id.*). As a result, like Suver, Krishnaprasad also teaches updating complex data in a database one row at a time (*id.*).

Thus, Suver and Krishnaprasad do not teach or suggest, either alone or in combination, a data structure that aggregates changes to values at arbitrary levels of a hierarchy of a complex structured column. Applicant respectfully submits, therefore, that claims 1 and 15 patentably define over the cited references.

Claims 8 and 18 recite, in part, a data structure that represents values in a complex structured type column as an aggregation of changes to the values at arbitrary levels of a hierarchy of the complex structured type column. Thus, claims 8 and 18 are believed to patentably define over the cited references for at least the same reasons discussed above with respect to claims 1 and 15.

Claims 2-6, 9-13, 16, 17 and 19-21 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Suver in view of Krishnaprasad. Claims 7, 14, and 22 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Suver in view of Krishnaprasad and in further view of U.S. Patent No. 6,122,644 (“Graefe”). As claims 2-7 depend from claim 1, claims 9-14 depend from claim 8, claims 16 and 17 depend from claim 15, and claims 19-22 depend from claim 18, Applicants respectfully submit that the dependent claims likewise patentably define over the cited references.

Accordingly, Applicants respectfully request that the rejections of claims 1-22 under 35 U.S.C. § 103(a) be withdrawn.

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PATENT

CONCLUSION

For at least the foregoing reasons, Applicants respectfully submit that the claims are allowable and that the present application is in condition for allowance. Reconsideration of the application and an early Notice of Allowance are respectfully requested. In the event that the Examiner cannot allow the present application for any reason, the Examiner is encouraged to contact the undersigned attorney, Bryan T. Giles at (215) 564-8954, to discuss the resolution of any remaining issues.

Respectfully submitted,

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/Bryan T. Giles/
Bryan T. Giles
Registration No. 60,078

Woodcock Washburn LLP
Cira Centre
2929 Arch Street, 12th Floor
Philadelphia, PA 19104-2891
Telephone: (215) 568-3100
Facsimile: (215) 568-3439